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U.S. Wage and hour and
public contracts divisions

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LEARNING PERIODS IN THE
WORK GLOVE INDUSTRY

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AUGUST 1943

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FOREWORD

Section 14 of the Fair Labor Standards Act provides for the issuance, by the Administrator, of certificates for the employment of learners at sub-minimum wage rates to the extent necessary to prevent curtailment of opportunities for employment and subject to such regulations as to time, number, production and length of service as he shall prescribe. In determining the standards to be prescribed for a particular industry, the regulations require consideration of the duration of the learning period. Although the concept of the learning period appropriate for the requirements of the Fair Labor Standards Act is somewhat different than similar concepts used for other purposes, the data developed in this study may be of considerable interest in connection with other aspects of the learner problem. It should be realized, however, that this report has been prepared with the specific objective of throwing light on the administrative problem of learner certification for the work glove industry pursuant to Section 14 of the Fair Labor Standards Act.

In the various stages in its preparation, the study was worked on by James Lynn, Henry Winthrop, and Sara Lewin of the Administrative Studies Section, and Alice Pokorny and Gertrude Klings of the Statistics Section, while the final report was prepared by James Lynn, under the general supervision of Harry S. Kantor, Chief of the Administrative Studies Section.

Harry Weiss, Director
Economics Branch

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LEARNING PERIODS IN THE WORK GLOVE INDUSTRY

I. INTRODUCTION

1. Reason for the study.

Section 14 of the Fair Labor Standards Act states that the Administrator shall issue certificates for the employment of learners at subminimum rates to the extent necessary to prevent curtailment of opportunities for employment and subject to such regulations as to time, number, proportion and length of service as he shall prescribe. 1/

Pursuant to the requirements of this section, Merle D. Vincent, Director of the Exemptions Branch, acting as the Administrator's representative, determined in his findings of February 8, 1940 that there was need for the granting of certificates for the employment of learners in the occupation of machine stitching in the work glove branch of the glove industry. He further determined that the learners might be employed at the subminimum rate for a period not exceeding 480 hours, or twelve 40 hour weeks.

1/ The learner regulations applicable to the gloves and mittens industry state:

- "1. Special learner certificates may be issued upon individual applications of employers provided that it is satisfactorily shown that:
 - (a) Experienced labor is not available in the locality from which the employer customarily draws his labor supply;
 - (b) Learners are available for employment at the established subminimum learner wage rate;
 - (c) The issue of a certificate will not tend to impair working or wage standards established for experienced workers in the industry;
 - (d) The issue of such certificates will not create unfair competitive labor cost advantages;
 - (e) The number of learners applied for will not tend to impair the statutory minimum wage rate in such plant;
 - (f) The applicant's piece work or hourly wage rates yield average earnings to experienced workers substantially above the minimum wage rate.
2. The subminimum wage rate which may be provided in special learner certificates shall be not less than 35 cents per hour.
3. Authorization to employ a number or percentage of learners for labor turnover in excess of that provided in learner industry regulations, issued pursuant to section 522.4 of the regulations of the Administrator of the Wage and Hour Division and presently in effect, may be granted to the extent of the actual need of an individual applicant, when that need is due to an abnormal labor turnover resulting from the war emergency."

See Administrative Order No. 181, Wage and Hour Division, U. S. Department of Labor.

(13,064)

On January 27, 1942, Industry Committee Number 40, in recommending a 40-cent minimum wage for the industry, requested that a hearing be held to determine the necessity for amending the then existing learner regulations. A hearing accordingly was held on April 28, 1942.

At the hearing representatives of management in the work glove branch of the industry submitted data to justify a request that the learning period for that branch be increased to 36 weeks. 1/ The representatives of labor, in opposing the increase, stated that the 480 hour period had proved sufficient and satisfactory. 2/ At the conclusion of the hearing the Exemptions Branch requested that the Economics Branch make a field analysis of the data submitted by the representatives of management and, if necessary, undertake its own study. This report has been prepared in response to that request.

2. Concepts of a learning period.

In the administration of a minimum wage law the concept of a learning period may vary widely from that used in industry. In fact, the concepts used in industry may vary widely among themselves.

Some plant executives and managers regard the learning period as the time necessary for the creation of a fully capable worker who is entirely comparable with an experienced worker. Admittedly, however, an experienced worker with two years experience, while fully capable, may be lacking somewhat in finesse, speed and flexibility when compared with the worker who has ten years experience. In short, in some occupations the worker may never stop learning.

Others may regard the learning period as the length of time necessary for the beginner to master the rudiments of the operation which he is learning or the length of time it takes to achieve a "reasonable amount" of production after having mastered the operation itself. "Reasonable amount" of production may be measured in terms of the average production of all experienced workers or of some group of experienced workers. Again, the learning period may be thought of as ending when the learning curve reaches a substantial plateau, i.e., when the learner's rate of progress has become relatively slow.

When dealing with day to day problems, management is often much more interested in the cost of training a new labor force than in an abstract learning period. The cost of training a new worker involves among other things:

- (1) The cost of paying the worker "make up", i.e., the difference between what the worker is credited with at the going piece rates and the minimum wage;
- (2) The cost of hiring and training workers who leave before they are fully trained or shortly thereafter;
- (3) The cost of instruction and increased supervision;

1/ Transcript of testimony, p. 4.

2/ Ibid., pp. 37, 38.

(4) The cost of spillage of materials and damage to tools.

All of these costs are not readily susceptible of measurement and are beyond the scope of this study.

In the administration of a minimum wage law the learning period may be defined as the length of time it takes a beginner to earn the legal minimum or some portion of the minimum, under the going piece rates in a particular plant, under the average piece rates in the industry, or under a piece rate designed to yield experienced workers a certain level of earnings.

In the case of the Fair Labor Standards Act, the Administrator, in determining the proper length of time for which learners may be employed at subminimum rates, must be concerned with the effects of his decision on the opportunities for employment. In making his decision, therefore, the length of the learning period may be but one of several considerations.

It is obvious that no definition of a learning period that may be adopted is free from ambiguity. Moreover, its length, however defined, is affected by a variety of factors such as training methods, supervision, level of wages, method of payment, type and age of machinery, the efficiency of management, amounts of heat, light and noise in the factory. Again the learner's age, mental outlook, and physical condition play their part. These are all factors which are not to be taken account of in this study.

3. Selection of firms to be studied.

The data for this study were originally obtained from 11 plants owned by three companies. However, the learner sample at two plants was insufficient to yield statistically reliable results. Consequently, the data for only nine plants are presented in this report.

One of the companies studied had submitted at the glove learner hearing a learner curve summarizing its experience with learners. Because the original data on which this chart was based were no longer available, the company agreed to make its payroll records available. The second company had introduced, at the hearing, exhibits showing the high cost of "make-up" paid to learners at two of its plants. It agreed that a further analysis should be made in order to develop a comparison between the earnings of learners and those of experienced workers. Both of these firms were non-union. The third company had contracts with the International Glove Workers Union of America, A. F. of L. The three companies were among the five largest in the industry. Two of the plants were located in cities of less than 5,000 population; three in cities of 5,000 to 10,000 population; one in a city of 25,000 to 100,000 population and three in cities of over 100,000 population.

Comparison of the sample plants with similar data for the industry as a whole indicates to some extent the representativeness of the sample. Eight of the plants were located in the Middle West and the Mississippi Valley. The ninth was located on the Eastern Seaboard. The 1939 Census of Manufactures shows that 69 percent of the firms in the industry were located in the Middle West and 19 percent on the Eastern Seaboard. The 1939 Census of Manufactures shows that 67 percent of the firms in the work glove industry employed 100 workers or fewer; 24.5 percent had 101 to 250

workers and 8.5 percent had over 250 employees. Seven of the plants in this study were in the 101 to 250 category and two had over 250 employees when the data were transcribed. No plants with fewer than 100 employees were included because it was impossible to secure an adequate sample of learners in such plants.

Both the Work Glove Institute and the union involved were consulted about the selection of firms and both groups agreed that the sample was representative and adequate.

4. Basic data obtained.

Information concerning the learner problem of the industry, basic policy, the learner training program, and occupational descriptions was secured by personal interview with officers of all three companies in May, 1942. This information was supplemented by visits to four plants in the course of which plant managers and supervisors were interviewed, and the flow of work in the factory and the actual operations were observed.

Transcriptions of weekly earnings and hours were made from the payroll records of nine plants for both experienced machine stitchers and learners in June, 1942. The data for experienced workers, wherever possible, were taken for four one week periods, namely, the weeks ending nearest to March 15, June 15, September 15, and December 15, 1941. For plants E, F and H only the latter three periods were secured. Experienced workers were defined as workers employed one year or longer as machine stitchers. Since a worker had to be employed at the plant during the three or four periods listed above, all these workers actually had about two years experience when the data were transcribed. Some experienced stitchers were excluded from the samples because they did not work on operations on which learners also worked. The average hourly earnings for each individual experienced worker were secured by averaging his earnings over the three or four representative weeks. A composite average earnings figure for each plant was derived by securing an average of all of these experienced workers.

The learner sample was of the "follow-up" type; that is, the earnings of a single group of learners were recorded for successive weeks. In order to avoid the difficulty of handling large numbers of learners who dropped out in the early weeks, only learners who worked 25 weeks or more were used. Thus the number of workers in the learner sample remains constant for the first 25 weeks, except in such cases where a learner's earnings in a particular week could not be determined from the payroll card. In some cases the size of the sample decreased in weeks subsequent to the twenty-fifth; in every case the "follow-up" was discontinued when the sample size went below eight learners. The data for learners were centered in 1941. In some cases the "follow-up" ran back into the latter half of 1940 and extended into the first half of 1942.

With learners, as with experienced workers, overtime payments 1/

1/ Overtime payments represented the extra half-time earnings for overtime work.

and make-up $\frac{1}{2}$ were deducted from total weekly earnings to secure weekly piece rate earnings. The piece rates at all plants were increased two or more times during the period covered by the survey. This meant that the earnings of workers in different periods were not comparable. Accordingly, the earnings of all workers in all periods were so adjusted that they reflected the piece rates in vogue at the time the data were obtained. It is to be expected, of course, that subsequently piece rates have been increased. All stitchers included in the survey were remunerated on a straight piece rate basis, necessitating no adjustment for bonus or other incentive plans.

The age of the learner at the time she was employed was also recorded. There were no male machine stitchers in any of the samples.

II. PRELIMINARY PROBLEMS ENCOUNTERED AND THEIR SOLUTION.

1. Description of the occupation.

The occupation of machine stitcher of work gloves is subdivided into a number of operations or sub-operations. When the survey was made the sub-operations varied widely between plants and companies and by style of glove and materials used.

Fundamentally, there are two types of work gloves--all cloth (Canton flannel and jersey) and leather palm. (Some all leather gloves are made, but they are unimportant in volume or are classified as semi-dress.) Secondly, these two types are subdivided into clute cut and gunn cut gloves. There are, in addition, many minor style variations. Some companies made over 500 styles of gloves; each of these styles entailed minor differences in the sewing operations

The names by which even the same operations are designated varied between companies. In general, however, one may state that the following are the operations used in making work gloves:

Closing - Sewing together the two halves of the glove.

Thumbing - Sewing in the thumb

Sew down or palm patch - Joining the leather palm to the cloth back of the glove. (Leather palms only.)

Fingering - Sewing in the fingers.

Backing - Sewing the seams on the back of the glove.

Wristing - Joining the wrist to the rest of the glove.

In addition, the following operations were often in evidence:

Tipping - Sewing leather tips on the fingers of the gloves (leather palms only).

Closing cuff - Closing cuff on gauntlet type gloves.

Welting - Sewing in a strip of material to strengthen the seam (leather palms only).

1/ Make-up represented the difference between what the worker received at the legal minimum under the Fair Labor Standards Act and the amount the worker earned at current piece work rates. As explained elsewhere, make-up for experienced workers sometimes represented the difference between what the worker had earned at her accustomed operation and what she earned at an unfamiliar one.

In addition to these operations, which may be regarded as standard, there were such operations as heeling, fancy stitching, sewing, pulley, and sewing knuckle strap. Sometimes operations were combined. All sorts of combinations were found, such as closing and fingering, fingering and thumbing, thumbing and wristing, sewing knuckle straps and tipping, and so forth. Operations, furthermore, were not necessarily standard between plants. Thus in one plant a thumbster sewed only the thumb, whereas in another he sewed not only the thumb but a reinforcement on the thumb and a trade mark on the glove.

Piece rates varied not only among operations but within operations by weight and type of material used and by style of glove. Thus a large plant was very likely to have 500 to 1,000 separate piece rates. Furthermore, the piece rate structures varied among plants not only insofar as they were designed to yield different over-all average hourly earnings, but also in the internal relations of the whole structure. In addition, as previously stated, neither the style of glove nor the operation was strictly comparable among plants.

2. Training methods.

The methods of training machine stitchers did not vary greatly from plant to plant. In general, no intensive specialized training program was given learners. Some plants set aside a section of their shop for the use of learners, but the majority interspersed them with the experienced workers. The general floor supervisor took care of the learners, who sometimes consumed most of her time. If there were a heavy influx of learners, extra foreladies were assigned solely to them. The learner sat at her own machine and had sole control of it. Her work did not affect the output of any other worker.

The learner often spent the first few hours or the first day making straight stitches. This served to acquaint her with the feel of the job and enabled her to learn to control the speed of the sewing machine. The second or third day she was assigned to her first operation which in some plants was a relatively simple one, like wristing. In the course of 6 or 8 weeks she was moved up to more difficult operations like thumbing or closing. Other plants assigned the learner to any operation where help was needed. In either case the learner, according to company officials and plant managers, usually worked on at least three operations before being finally and permanently assigned to one operation. The final assignment often came between the sixth and tenth weeks.

Gloves are difficult to sew because the seams are short and the pieces are numerous and peculiarly shaped. The speed of the worker is largely determined by her finger dexterity, which enables her to make turns without slowing or stopping the machine. The learning period is not spent in learning to operate the machine, but in acquiring speed.

The shifting from operation to operation, as described above, was in most cases confined to learners; experienced workers were shifted only when there was a rush order or when an experienced worker in one section became ill or when a similar emergency arose. Experienced workers did undergo constantly the minor variations in task which were attendant upon changing from one style of glove to another. In general, the better management can plan and control the flow of work, the less

the necessity for shifting experienced workers. The more operations an experienced worker can perform, the more flexible can be the operation of the plant.

When an experienced worker was shifted to an operation with which she was unfamiliar, she frequently failed to reach the level of earnings to which she was accustomed. Consequently, it was the practice in the industry to guarantee an experienced operator the full amount of her average hourly earnings over the preceding three or four weeks when she was shifted to a new operation. This was a cost management wished to avoid.

3. Methodology adopted.

An ideal study of the learning period in the work glove industry would involve comparison of groups of learners who remained on one operation, one style of glove and one weight of material during their learning period with groups of experienced workers who worked on the identical operation, style of glove and material during the same period of time. If the operations were identical among plants it might then be possible to develop a composite learning curve.

Because of the circumstances described in earlier sections, such an approach was impossible in the work glove industry. Inasmuch as the operations and internal piece rates structures were not comparable among plants, it was impossible to combine plant data to secure a composite learning curve.

There appears to be evidence, however, which justifies the lumping together within plants of all of the operations which compose the occupation of machine stitching. Plant executives stated that it is their policy to so set piece rates that the plant average hourly earnings for each operation or sub-operation are equal. When new styles were produced the piece rates were considered experimental and were changed until they were consistent with the rest of the structure. Occasionally checks were made of the earnings on the various operations and adjustments in the old rates were made if thought necessary. Some plants tried to set piece rates so as to yield closers (closing is the most difficult glove sewing operation), a cent or so per hour more. It seems that they often underestimated the difficulty of the operation for closers received about the same earnings in these plants. Sometimes the simplest operations yielded the highest average hourly earnings.

A wage survey made by the Bureau of Labor Statistics in July, 1941 in the work glove industry ^{1/} showed that all sewing operations, save one, comprising 80 percent of a total of 1,626 stitchers had average hourly earnings falling within a range of 2.5 cents. The fingerers had average hourly earnings 3 cents below that of the next lower group of stitchers. It appears that these findings substantiate, at least in part, the claims of management. Consequently, this study will consider

^{1/} See Bureau of Labor Statistics, Wages and Hours in the Glove Industry, 1941.

machine stitching one occupation and will present combined data for all sub-operations in each plant. No other procedure appears feasible.

III. THE EFFECT OF SHIFTING ON THE LENGTH OF THE LEARNING PERIOD.

The methodology adopted does not imply that it was assumed that the shifting of learners from operation to operation had no effect on the length of the learning period.

An attempt to determine the effect of changes in operation was made by selecting at random three workers in each plant and plotting their individual piece rate earning by week of employment. The weeks in which operational changes occurred were marked on the chart. Inspection and comparison with the records of other learners showed that the learners chosen were quite representative. It must be borne in mind, of course, that this approach assumes that all changes in operation were noted on payroll cards. The fact that plant managers and company officials stated that a girl usually changed operations three times, whereas the payroll cards show substantially fewer changes, indicates that such an assumption is not necessarily valid and hence all conclusions drawn must be qualified.

Three of the charts which are typical and representative are shown in this report. In Plant B (Chart 1) ^{1/} Learners A and B underwent operational changes whereas Learner C did not. Learner C progressed more rapidly in the first 4 weeks, but by the sixth Learner A had caught up. Operational changes caused immediate drops in the earnings of Learners A and B, which were followed by immediate recoveries; these drops were no more severe than some not caused by operational changes nor more severe than some of the fluctuations in C's learning curve. In Plant F (Chart 2) Learners A and C underwent many operational changes, whereas Learner B underwent none. Nevertheless, C progressed about as well as B; A was much slower in the early weeks, but rose rapidly after the 25th week. C had drops in the fourth and 30th weeks caused by operational changes, but in the fifth week she had increased earnings despite a change in operation. Learner A had several operational changes which were accompanied by an immediate increase in earnings. None of the learners in Plant H (Chart 3) underwent changes in operation and yet their earnings show wide fluctuations. Data beyond the 26th were not available at this plant.

As was to be expected, the individual learning curves showed much greater irregularity than the composite plant curves (see Charts 4-12 and Section IV of this report). The charts also showed that there was a considerable transfer of skill when a learner moved from one operation to another. Nevertheless, a change in operation often, but not always, was followed by a decrease in earnings. This initial setback was usually succeeded by a rapid recovery. Changes back to a familiar operation were generally followed by a rise in the curve. Rises in the curve

^{1/} See Appendix tables 1, 2 and 3 for the actual hourly earnings of learners shown in Charts 1, 2 and 3.

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CHART 1. Average hourly earnings of three learners selected at random,
by weeks of experience

Plant B

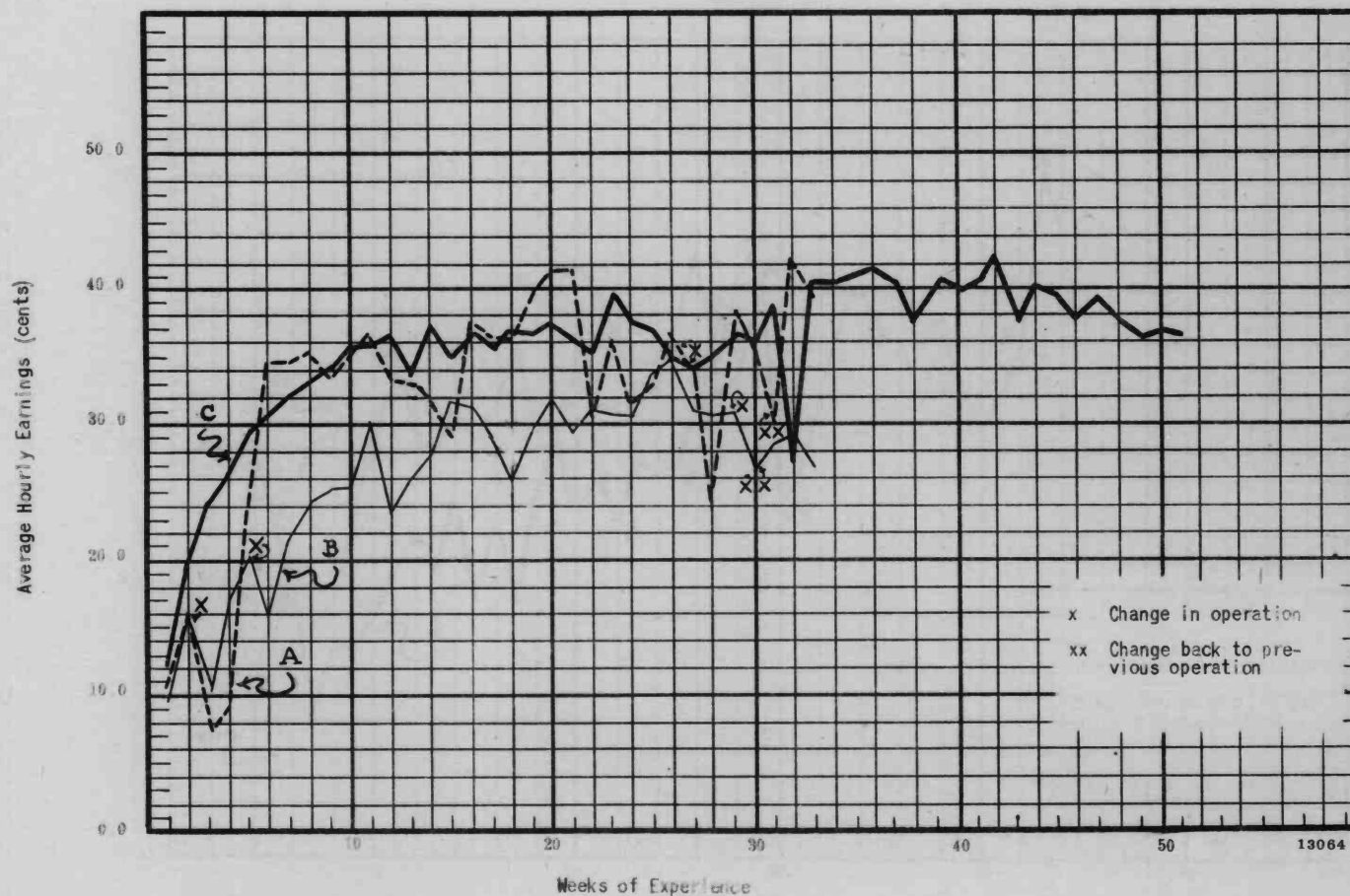


CHART 2. Average hourly earnings of three learners selected at random,
by weeks of experience

Plant F

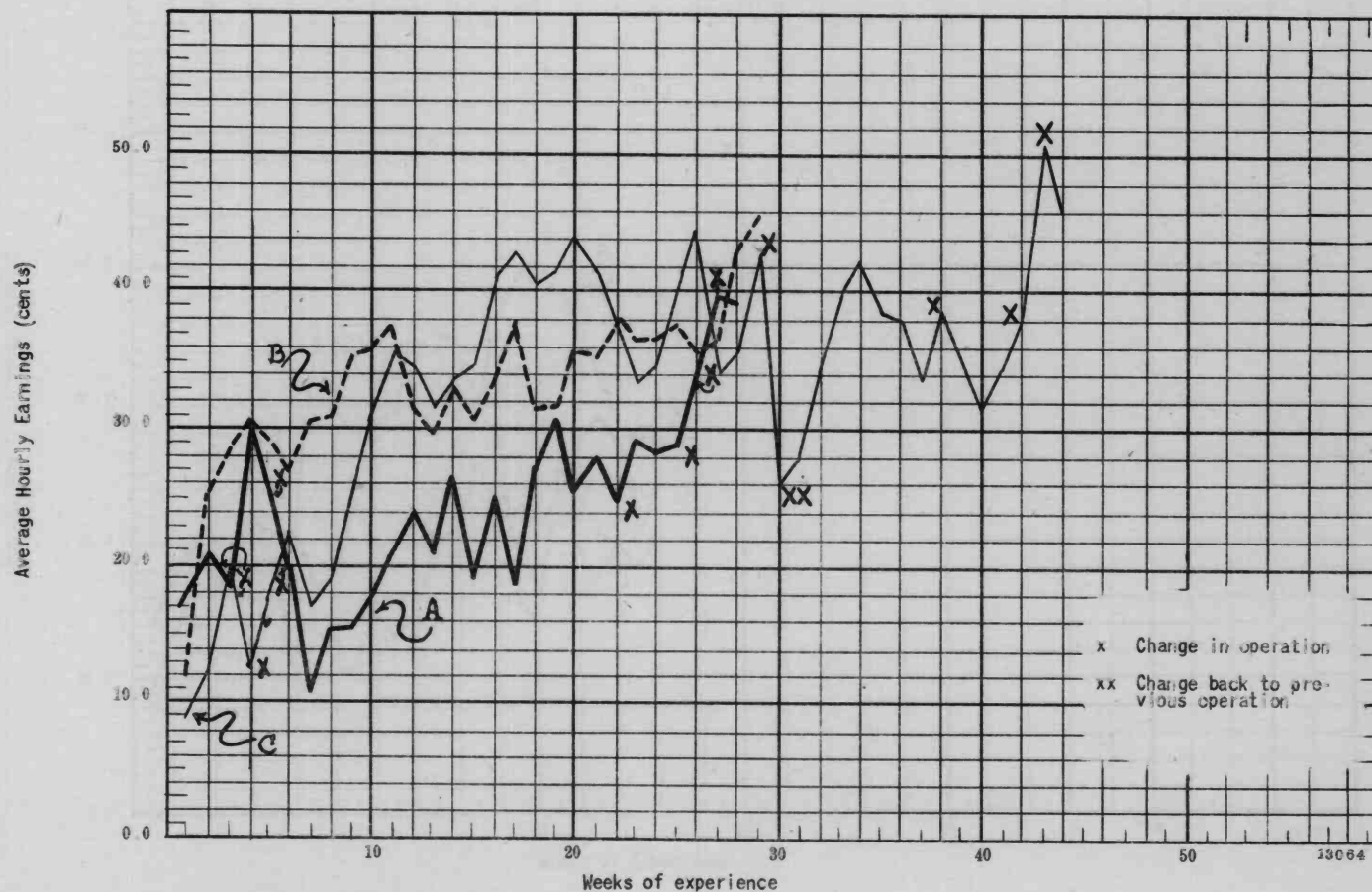
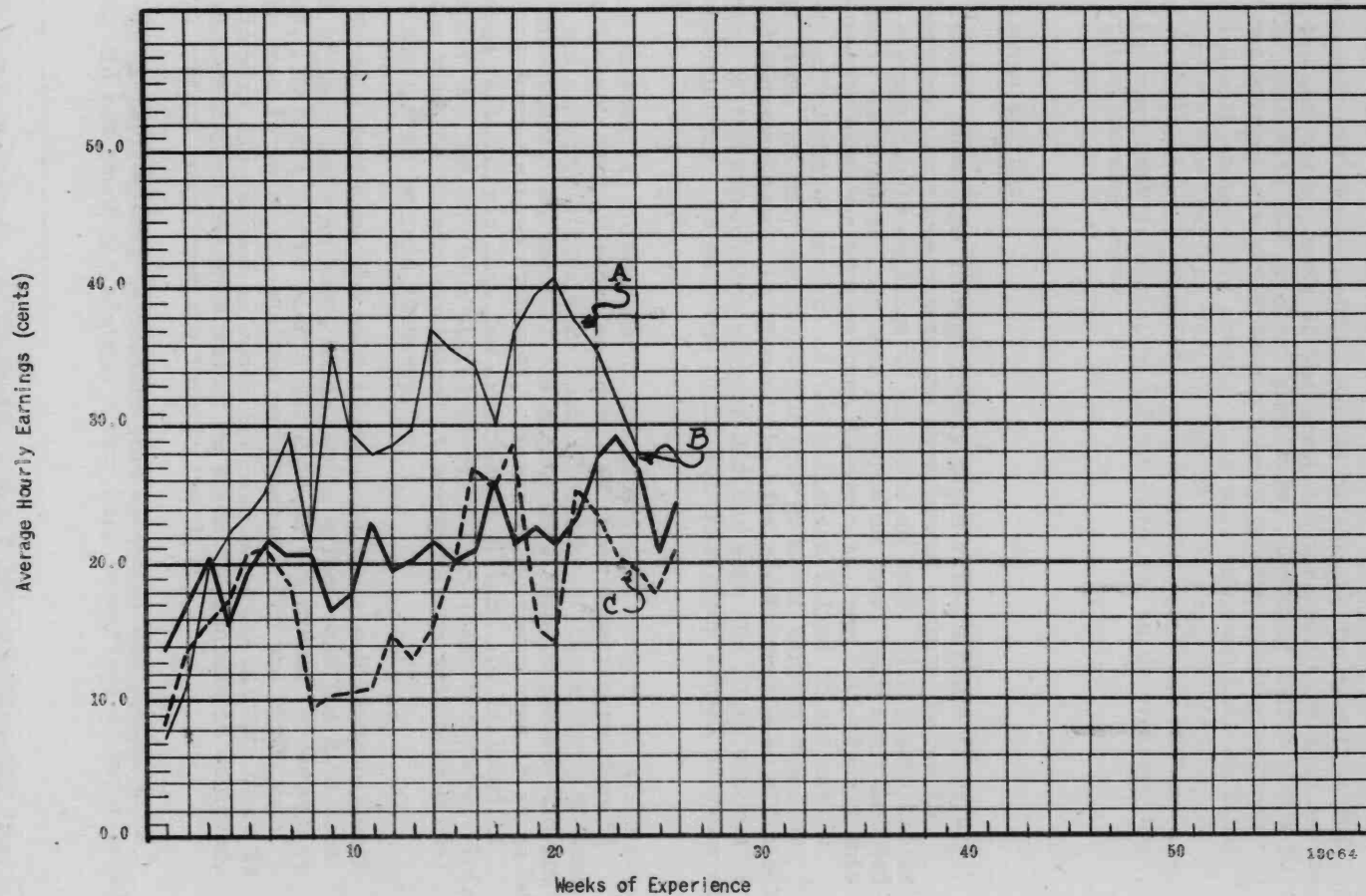


CHART 3: Average hourly earnings of three learners selected at random,
by weeks of experience

Plant H



immediately after changes to an unfamiliar operation may be attributed to the fact that the new operation was more suited to that particular learner's abilities. Increased attention and effort on new operations may have affected, in all cases, the results of operational changes.

However, the irregularities caused by changes in operation did not account for the majority of the irregularities nor were they necessarily the ones with the greatest amplitude. Learning curves where no operational changes are noted do not appear greatly dissimilar from those where such changes did occur. This does not mean that shifting did not prolong the learning period, but it does suggest that style changes, materials used, production tempo and the numerous factors already cited were just as decisive, if not more so, in determining the course of the learning curve.

IV. LEARNING PERIODS

Table 1 shows the average hourly piece rate earnings of experienced workers. At three plants the experienced workers failed to achieve average hourly earnings of 40 cents an hour. Six plants had average hourly earnings of less than 45 cents an hour; only one plant had average hourly earnings of more than 50 cents an hour. At three plants the least efficient 25 percent of the stitchers failed to average 30 cents an hour. At only one plant did this group of workers equal or exceed 40 cents an hour. At five of the nine plants the least efficient 10 percent of the experienced workers did not earn the legal minimum of 32.5 cents an hour. At only one plant did this group exceed 35 cents an hour. 1/

A substantial percentage of the experienced workers at all plants but one did not earn 40 cents an hour. At three plants more than 50 percent and at three others more than 35 percent of the workers did not reach this figure. At three of the plants more than 10 percent did not reach 32.5 cents an hour (Table 2). In assessing these data it is to be remembered particularly that few experienced workers are included in the samples who had not been sewing gloves for at least two years. This indicates that the plants considered it worthwhile to retain many employees who had to be paid "make-up."

Table 3 indicates the week in which learners achieved the legal minimum of 32.5 cents an hour, which was in effect when the data were obtained. At three of the plants the data do not extend far enough to show the week in which the minimum was reached. For the six plants whose learners did succeed in reaching or exceeding the minimum there is great variability in the week number in which the minimum is achieved. The week numbers range from the 13th to the 32nd.

It is particularly noticeable that at two of the plants whose learners did not reach the minimum a very high percentage of experienced

1/ The earnings figures for Companies 1 and 2 differ noticeably from those mentioned at the hearing. See transcript of testimony, pages 14 and 34.

Table 1: Average hourly earnings of experienced workers, by plant

Plant	Company	Total number in sample	Average hourly earnings of all experienced workers	Average hourly earnings of the least efficient 10% of experienced workers	Average hourly earnings of the least efficient 25% of experienced workers
A	1	196	43.3	34.4	36.1
B	1	88	41.7	31.0	33.5
C	1	184	43.4	30.4	34.4
D	1	148	39.6	25.7	29.2
E	3	114	45.4	36.0	38.5
F	3	150	46.5	34.0	37.6
G	2	164	36.4	24.5	27.7
H	2	234	35.7	23.7	26.3
I	3	212	53.3	40.4	42.6

Table 2. Percentage of experienced workers with earnings below 32.5 cents and 40 cents an hour, by plant.

Plant	Percentage of experienced workers whose average earnings fell below 32.5 cents an hour	Percentage of experienced workers whose average earnings fell below 40 cents an hour
A	1.0	35.2
B	9.1	45.6
C	6.0	35.3
D	17.6	54.1
E	0.9	15.8
F	2.7	16.7
G	29.3	67.7
H	31.2	73.9
I	1/	2.8

1/ None.

Table 3. Week in which learners achieved the legal minimum of 32.5¢ which was in effect at the time the data were transcribed, by Plant.

<u>Plant</u>	<u>Week</u>
A	14
B	21
C	18
D	32
E	<u>1/</u>
F	19
G	<u>2/</u>
H	<u>3/</u>
I	13

- 1/ Did not reach legal minimum: maximum of 29.5¢ earned the 30th week.
2/ Did not reach legal minimum: maximum of 32.0¢ earned the 23rd week.
3/ Did not reach legal minimum: maximum of 28.7¢ earned the 18th week.

workers also did not earn the minimum. At Plant G, 29.3 percent and at Plant H, 31.2 percent of the experienced workers had average hourly earnings of less than 32.5 cents an hour. Records at the two plants show that some workers with 10 and 15 years of experience were still receiving make-up. At Plant D the learners did not reach the minimum wage by the 30th week and yet almost all the experienced workers were earning over 32.5 cents an hour; the average hourly earnings for experienced workers at this plant were 45.4 cents an hour. The situation at this plant is inconsistent when compared with the situation at the other eight plants.

Charts 4 to 12 compare the average hourly earnings of learners by week of experience with the first decile, ^{1/} the first quartile, ^{2/} the third quartile, ^{3/} and the average of experienced workers. Table 4 contains the earnings of learners at the first and third quartiles in selected weeks. Tables 5 to 13 show the average hourly piece rate earnings of learners expressed absolutely and as a percentage of the earnings of experienced workers, by plants.

In Plant A the average learner reaches the first decile of experienced workers in the 18th week; in this same week the third quartile of learners exceeds the first quartile of experienced workers. The average hourly earnings of learners do not reach the average of experienced workers but the third quartile of learners exceeds the average of experienced workers in the 30th week. By the 13th week, the average hourly earnings of learners have reached 76.7 percent of the average hourly earnings of experienced workers. From this point on progress is slower. In the 23rd week, learners earn as much as they do in the 41st, namely, 87.8 percent of the experienced worker's average hourly earnings. However, in the 37th week the earnings of learners are 42.6 cents an hour or 98.4 percent those of experienced operators. The interquartile range ^{4/} of learners is 9.4 cents in the sixth week; it widens slightly in the 12th week and then narrows sharply in the 18th and 24th weeks to 5.6 and 5.1 cents, respectively, only to widen markedly in the 30th week to 10.8 cents. This is caused by the fact that the first quartile of learners in the 24th and 30th weeks is almost equal to the first quartile in the 18th week whereas the third quartile of learners increases sharply from the 24th to the 30th week.

In Plant B the earnings of the average learner exceed the first decile of experienced workers in the 23rd week. In the 18th week the

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- ^{1/} The first decile is that point on the scale below which one-tenth and above which nine-tenths of the total number of cases lie.
 - ^{2/} The first quartile is that point on the scale below which one-quarter and above which three-quarters of the total number of cases lie.
 - ^{3/} The third quartile is that point on the scale below which three-quarters and above which one-quarter of the total number of cases lie.
 - ^{4/} The distance along the scale between the first and third quartiles; one-half the total number of cases lie within this range.

Table 4. Earnings of Learners at the First and Third Quartiles in Selected Weeks

Plant	6th week		12th week		18th week		24th week		30th week	
	First quartile	Third quartile	First quartile	Third quartile	First quartile	Third quartile	First quartile	Third quartile	First quartile	Third quartile
A	16.5	25.9	25.9	36.0	33.2	38.8	33.9	39.0	33.9	44.7
B	16.9	27.4	22.9	32.6	25.2	35.9	29.0	36.5	-- 1/	-- 1/
C	19.2	24.2	23.9	32.6	27.4	36.3	29.4	37.5	33.2	41.1
D	18.1	21.7	23.3	29.6	23.8	35.5	23.8	33.8	22.5	34.7
E	14.0	22.0	17.3	27.1	18.3	29.7	21.7	33.0	26.4	33.0
F	14.7	26.9	22.9	31.8	27.7	34.7	31.6	35.9	30.7	37.5
G	17.7	25.7	24.4	30.5	27.7	32.7	30.3	33.6	28.5	33.5
H	16.0	22.4	18.4	28.5	22.1	35.7	22.0	28.0	-- 2/	-- 2/
I	18.7	28.3	26.9	34.8	30.9	39.6	31.5	41.1	35.0	44.3

1/ Inadequate sample.

2/ No data

Table 5. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant A

Weeks of experience	Number of learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	16	8.8	20.3
2	15	12.8	29.6
3	16	14.9	34.4
4	15	16.7	38.6
5	16	19.9	46.0
6	16	21.7	50.1
7	16	23.5	54.3
8	16	25.7	59.4
9	16	27.8	64.2
10	16	30.1	69.5
11	16	29.8	68.8
12	16	31.4	72.5
13	16	33.2	76.7
14	16	32.8	75.8
15	16	33.4	77.1
16	15	33.5	77.4
17	16	35.1	81.1
18	16	36.5	84.3
19	16	34.7	80.1
20	16	34.5	79.7
21	16	35.8	82.7
22	16	37.2	85.9
23	16	38.0	87.8
24	16	35.9	82.9
25	16	34.6	79.9
26	15	36.0	83.1
27	15	36.7	84.8
28	15	37.0	85.5
29	14	37.0	85.5
30	13	38.3	88.5
31	12	37.1	85.7
32	13	35.5	82.0
33	12	37.5	86.6
34	12	37.3	86.1
35	9	42.6	98.4
36	12	39.9	92.1
37	11	40.4	93.3
38	11	39.7	91.7
39	11	38.5	88.9
40	10	38.5	88.9
41	11	38.0	87.8

CHART 4 Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant A

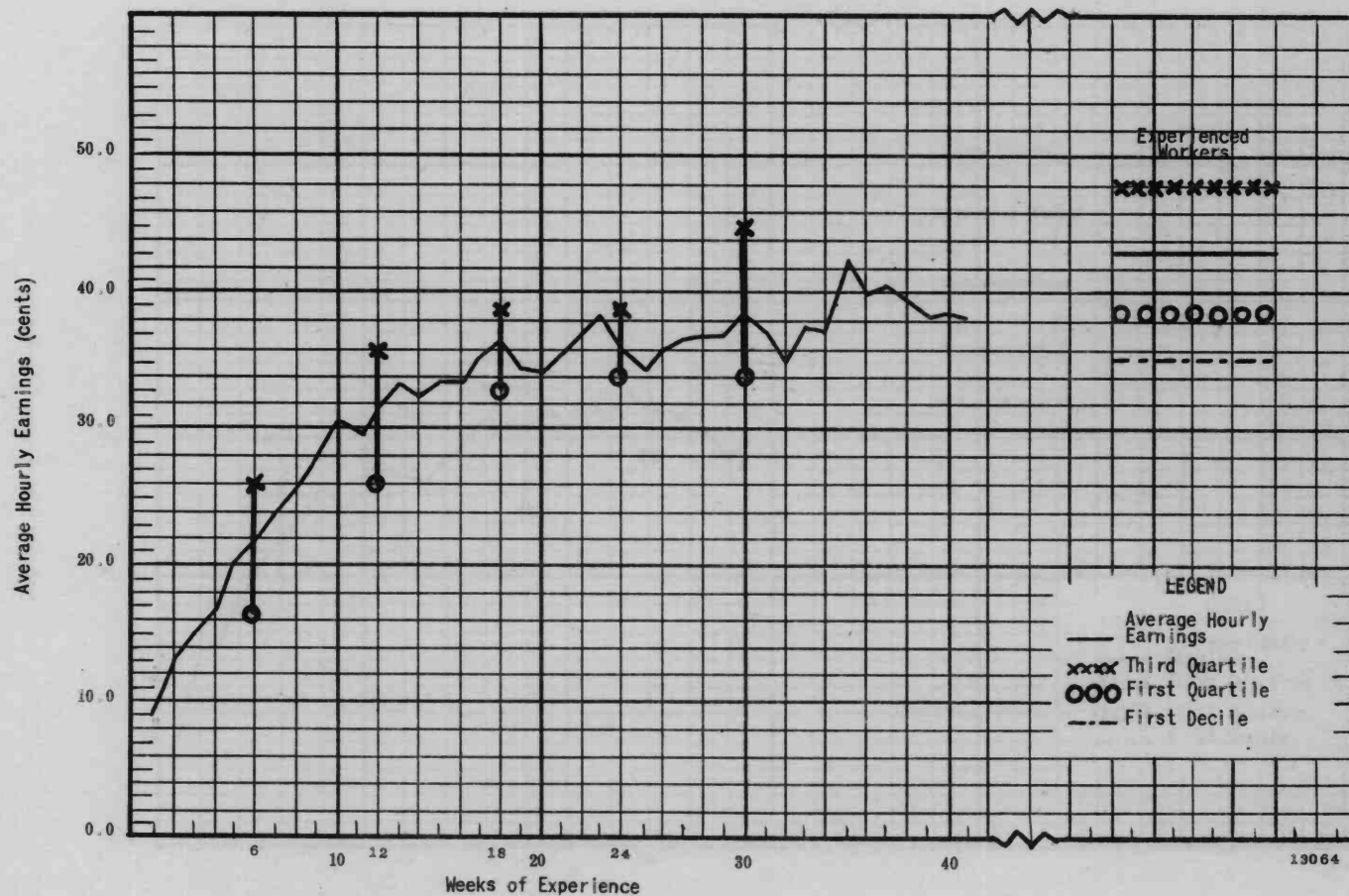


CHART 5. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant B

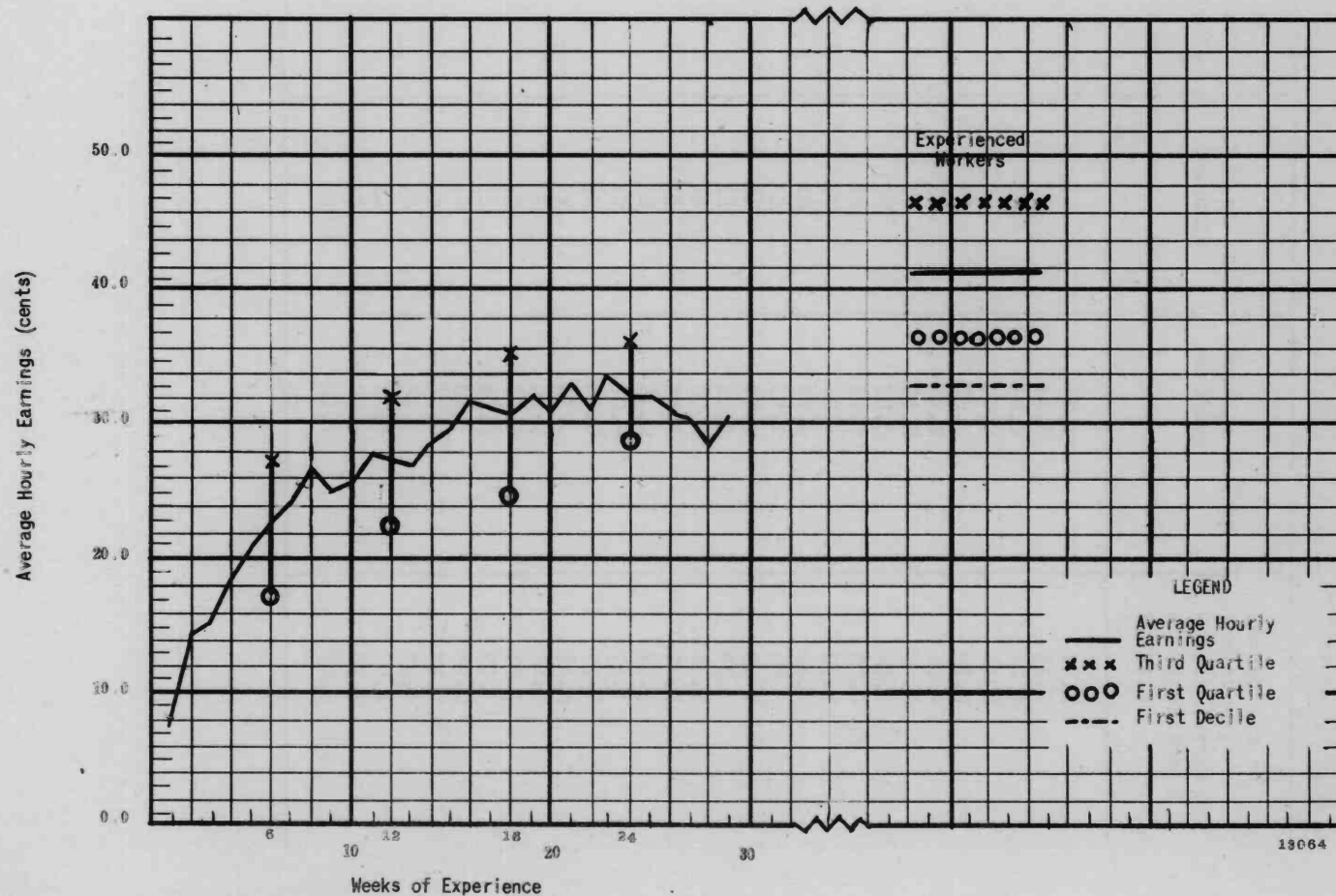


Table 6. Average hourly earnings of learners,
by number of weeks of experience, compared
with average hourly earnings of experienced
workers. Plant B

Weeks of experience	Number of learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	12	8.1	19.4
2	12	14.3	34.3
3	12	14.9	35.7
4	12	18.2	43.6
5	12	20.6	49.4
6	12	22.7	54.4
7	12	24.2	58.0
8	12	26.5	63.5
9	12	25.0	60.0
10	12	25.7	61.6
11	12	27.8	66.7
12	12	27.2	65.2
13	12	27.0	64.7
14	12	28.8	69.1
15	12	29.7	71.2
16	12	31.4	75.3
17	12	31.0	74.3
18	12	30.9	74.1
19	12	32.0	76.7
20	12	31.1	74.6
21	12	32.9	78.9
22	12	31.3	75.1
23	11	33.4	80.1
24	12	32.1	77.0
25	12	32.0	76.7
26	12	31.1	74.6
27	12	30.6	73.4
28	11	28.4	68.1
29	9	30.7	73.6

third quartile of learners considerably surpasses the first decile and almost reaches the first quartile of experienced workers. By the 16th week, average hourly earnings of learners are 75.3 percent of those of experienced workers; thereafter progress is quite irregular. There is no continuous rise in the learning curve after the 16th week. In the 6th, 12th, and 18th weeks, the interquartile range of learners remains very constant and is almost identical with that of experienced workers. In the 24th week it has narrowed considerably because the first quartile has risen relative to the third quartile.

In Plant C the average hourly earnings of learners do not reach the first decile of experienced workers until the 28th week, but the third quartile of learners surpasses the first decile of experienced workers in the 18th week. The first plateau in the learning curve is reached in the 12th week but there is a spurt beginning with the 16th week which reaches its high point in the 18th week. In this week the average earnings of learners are 79.5 percent of those of experienced workers. By the 33rd week learners are earning over 40 cents an hour or 93.1 percent of the average of experienced workers. There is little change in the interquartile range of learners in the 12th, 18th, 24th, and 30th weeks. However, the interquartile range of learners is considerably smaller than that of experienced workers.

In Plant D the average learner reaches the first decile of experienced workers in the 14th week; the third quartile of learners exceeds the first decile of experienced workers in the 12th and the first quartile of experienced workers in the 18th week. The rapid rise of the learning curve is checked in the 11th week when the learners' earnings are 69.2 percent of those of experienced workers. Thereafter, progress is slow until the 25th week when the curve begins a gradual though somewhat irregular rise which culminates, within the limits of the available data, in the 33rd week; at this point the earnings of learners are 83.8 percent of those of experienced stitchers. It is particularly noticeable that the third and first quartiles of learners in the 18th week exceed the third and first quartile respectively of learners in the 30th week. The interquartile range increases sharply from the sixth to the 12th to the 18th weeks and thereafter tends to remain relatively stable. This means that the more rapid progress of the better learners is checked after the 18th week when the rate of progress of the two groups becomes relatively equal.

In Plant E neither the average nor the third quartile of learners reaches the first decile of experienced workers within the period for which data were available. The progress of learners is extremely slow and yet steady when compared with learners in the other eight plants. As stated above, the situation at this plant is completely disparate when compared with that at the other plants.

In Plant F, the average learner does not exceed the first decile of experienced workers until the 38th week; the third quartile of learners equals the first decile of experienced workers in the 30th week. The learning curve rises steadily from the 1st to the 20th week, when there is a noticeable levelling off. At this point, learners' earnings are 71.6 percent of those of experienced stitchers. During the next 18 weeks learners make an advance of only 10 percent of experienced workers'

CHART 6. Average hourly piece rate earnings of learners by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant C

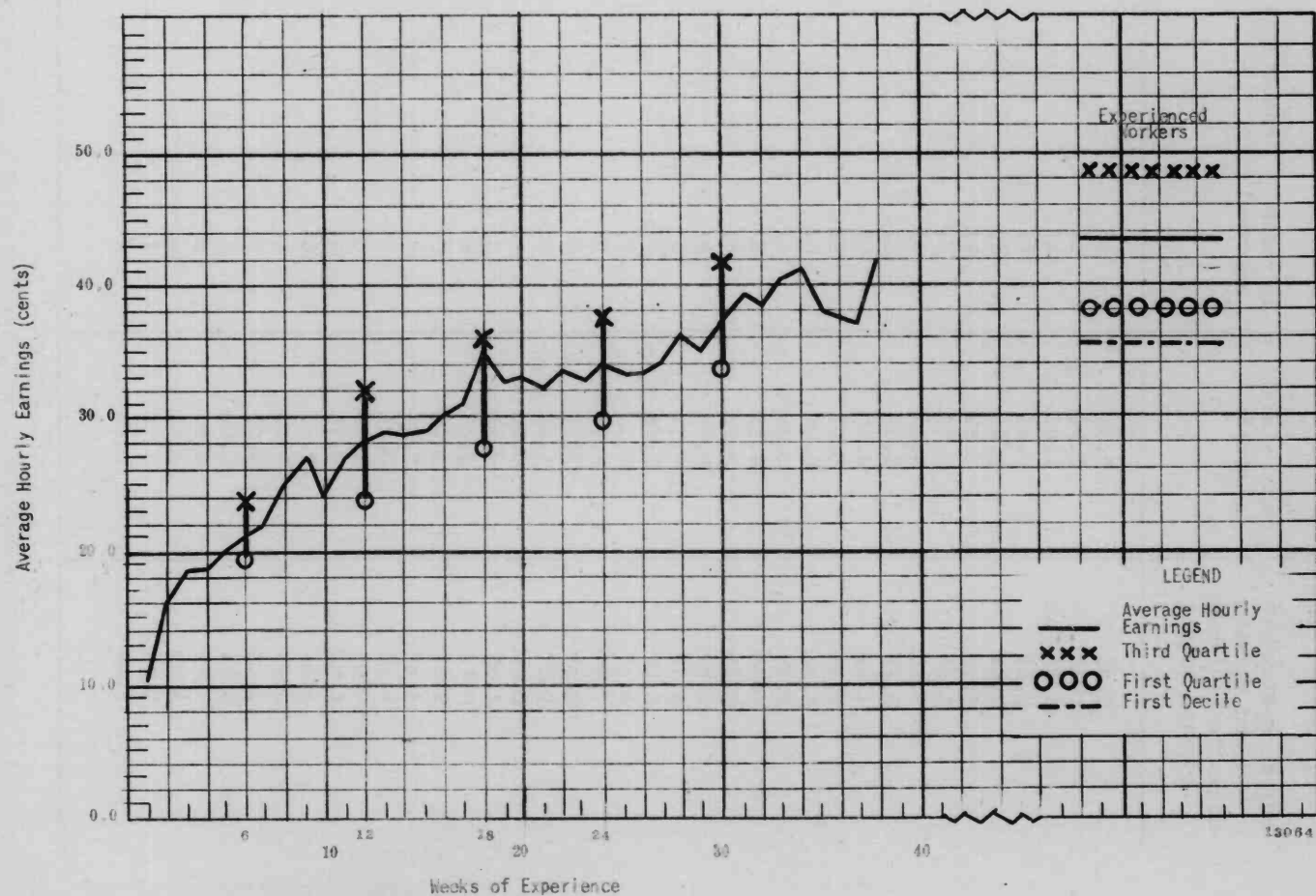


Table 7. Average hourly earnings of learners,
by number of weeks of experience, compared
with average hourly earnings of experienced
workers. Plant C

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	15	10.7	24.7
2	13	15.5	35.7
3	14	18.4	42.4
4	13	18.9	43.5
5	15	19.9	45.9
6	14	21.3	49.1
7	13	22.2	51.2
8	15	24.4	56.2
9	12	26.8	61.8
10	14	23.5	54.1
11	14	26.3	60.6
12	15	28.0	64.5
13	14	28.5	65.7
14	15	28.5	65.7
15	15	28.6	65.9
16	14	29.9	68.9
17	15	31.0	71.4
18	15	34.5	79.5
19	15	32.3	74.4
20	14	32.6	75.1
21	15	32.1	74.0
22	15	33.3	76.7
23	14	33.0	76.0
24	15	33.9	78.1
25	14	33.4	77.0
26	15	33.5	77.2
27	15	33.9	78.1
28	14	36.0	82.9
29	13	35.1	80.9
30	12	37.2	85.7
31	9	39.7	91.5
32	9	38.7	89.2
33	9	40.4	93.1
34	9	40.9	94.2
35	9	38.0	87.6
36	9	37.4	86.2
37	9	37.4	86.2
38	9	41.0	94.5

Table 8. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant D

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	21	7.4	18.7
2	21	13.2	33.3
3	21	16.6	41.9
4	21	18.4	46.5
5	21	20.2	51.0
6	21	20.3	51.3
7	21	21.4	54.0
8	21	22.4	56.6
9	21	24.5	61.9
10	21	24.5	61.9
11	21	27.4	69.2
12	21	26.3	66.4
13	21	25.8	65.2
14	21	28.4	71.7
15	21	28.6	72.2
16	21	29.0	73.2
17	21	29.5	74.5
18	21	29.3	74.0
19	21	28.8	72.7
20	21	28.7	72.5
21	21	28.3	71.5
22	21	29.0	73.2
23	21	29.0	73.2
24	21	28.3	71.5
25	21	28.3	71.5
26	19	30.5	77.0
27	18	31.2	78.8
28	16	29.6	74.7
29	15	31.2	78.8
30	15	30.0	75.8
31	14	31.0	78.3
32	14	32.5	82.1
33	14	33.2	83.8
34	12	31.6	79.8
35	10	32.6	82.3

CHART 7. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant D

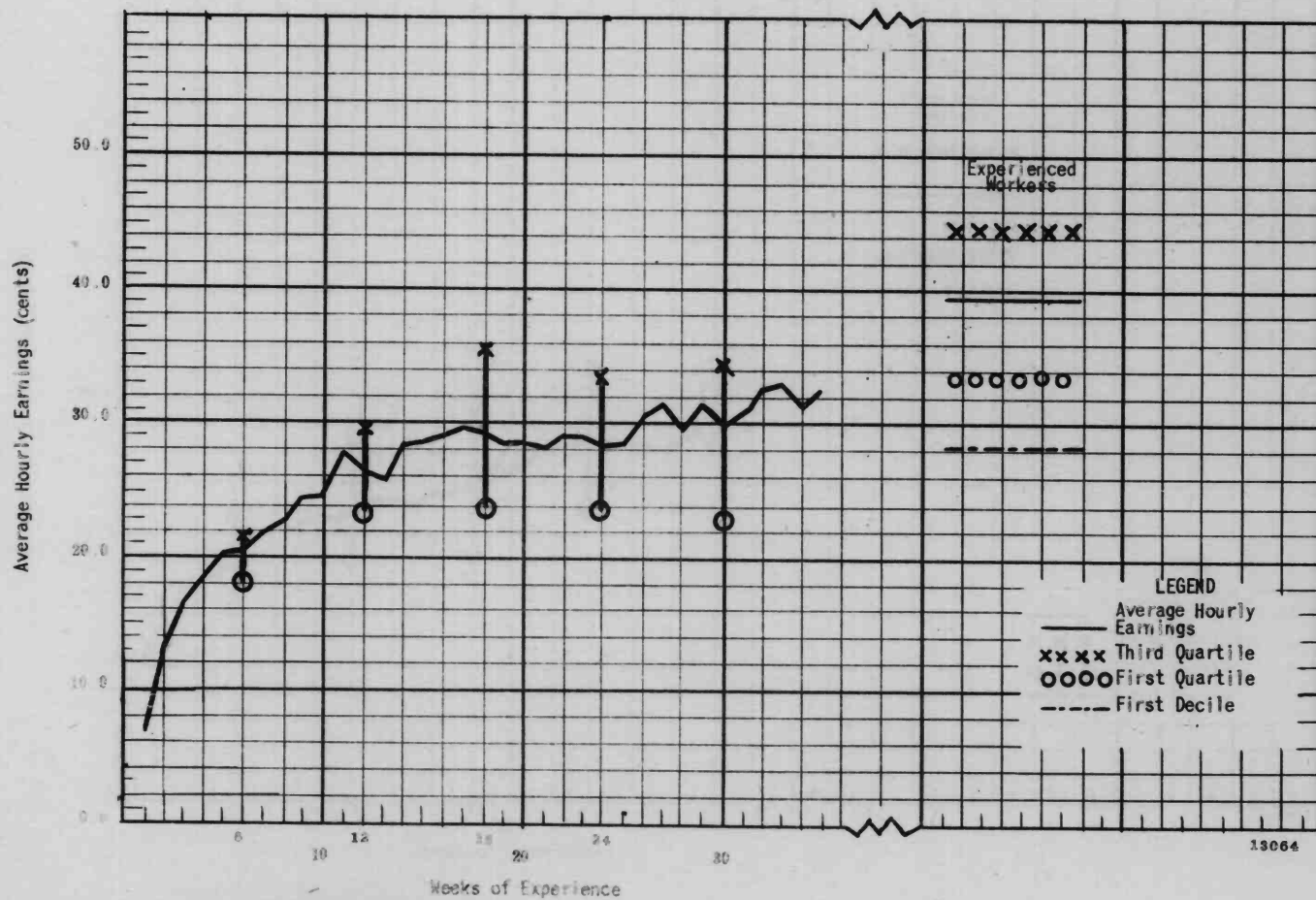


CHART 8. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant E

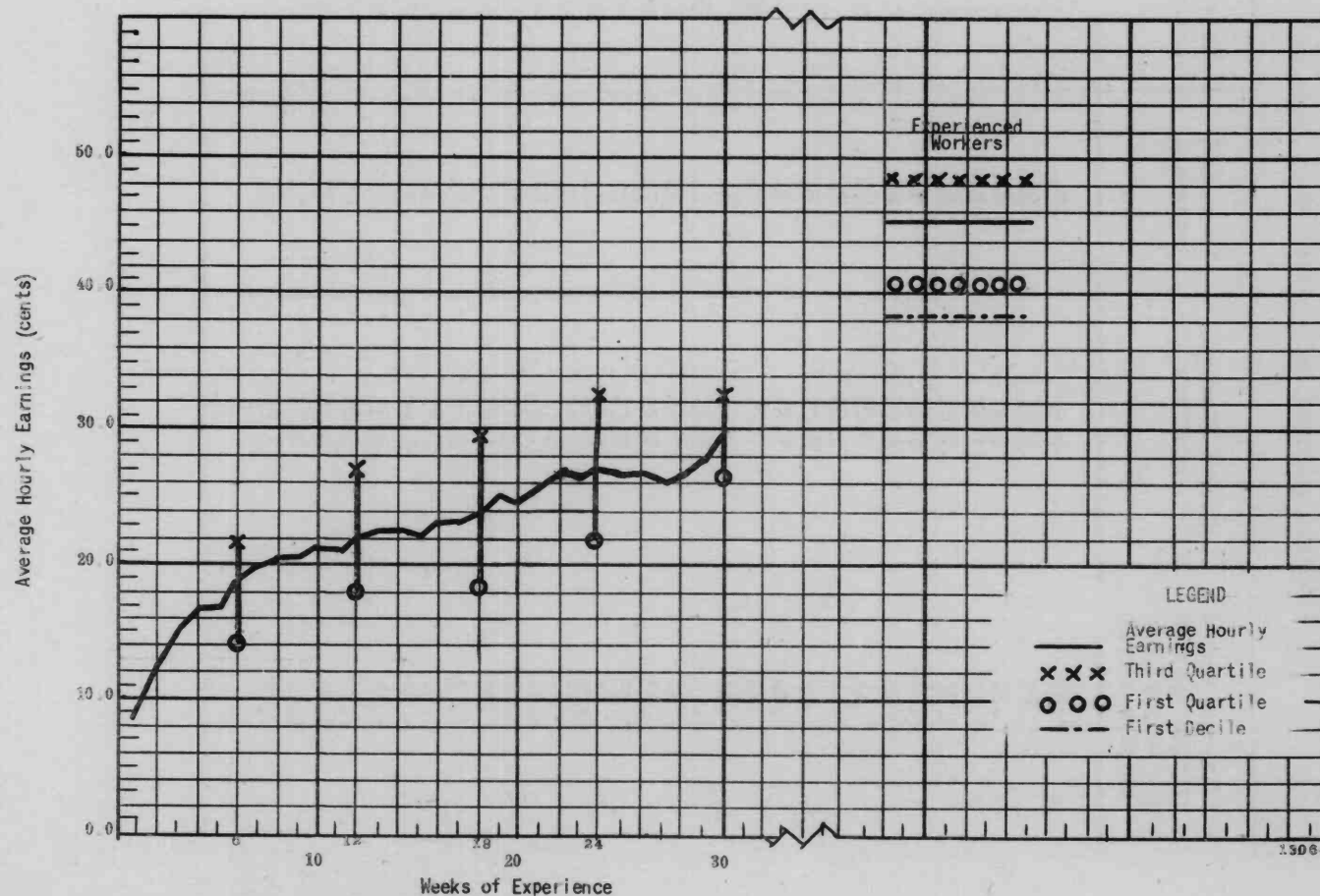


Table 9. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant E

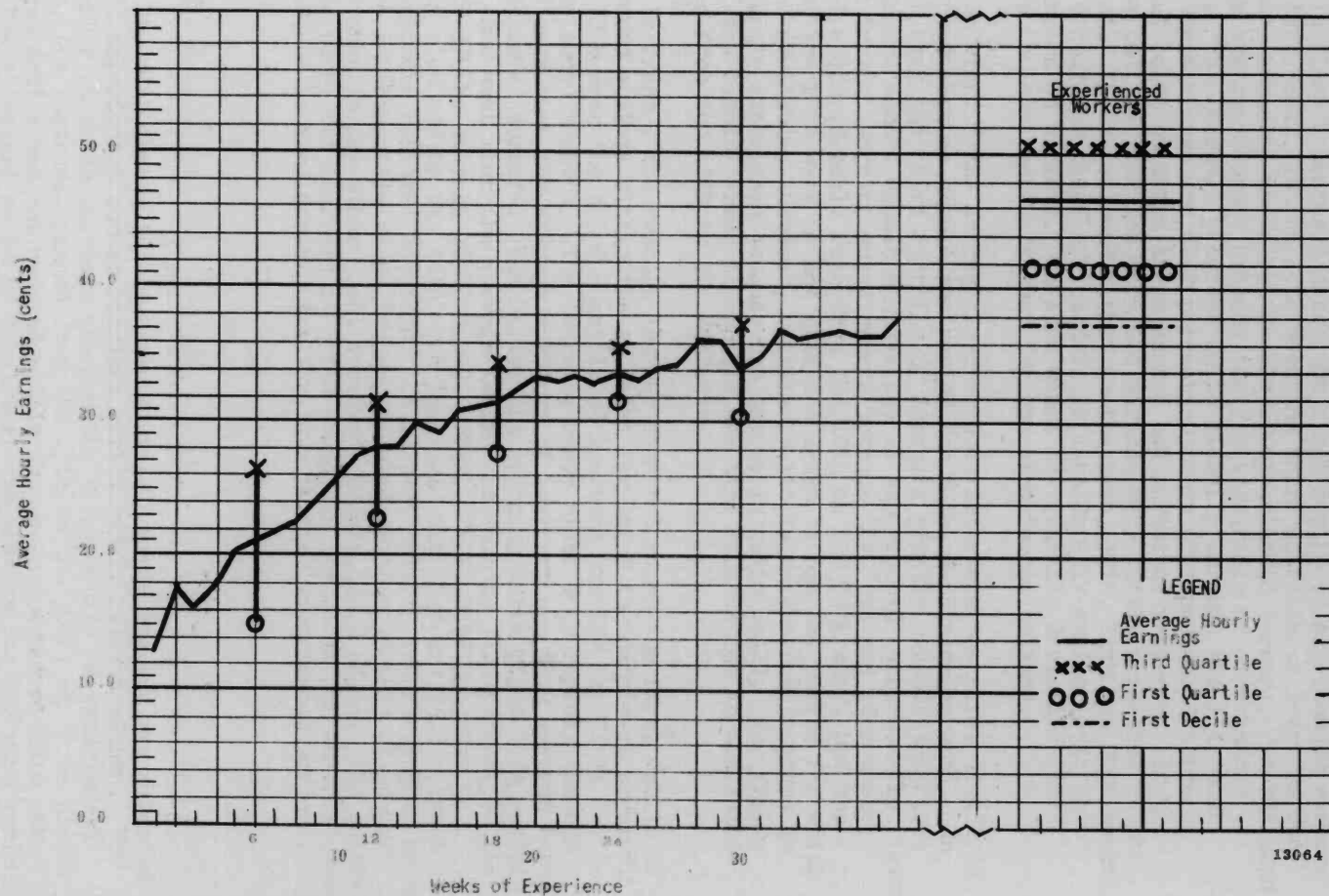
Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	48	8.5	18.7
2	48	12.4	27.3
3	48	14.3	31.5
4	48	16.1	35.5
5	48	16.8	37.0
6	48	18.3	40.3
7	48	19.5	43.0
8	48	20.0	44.1
9	48	20.1	44.3
10	48	20.8	45.8
11	48	20.9	46.0
12	48	22.0	48.5
13	48	22.5	49.6
14	48	22.5	49.6
15	48	22.2	48.9
16	47	22.9	50.4
17	48	23.0	50.7
18	48	23.8	52.4
19	48	25.0	55.1
20	47	24.7	54.4
21	48	25.8	56.8
22	48	26.4	58.1
23	48	26.3	57.9
24	48	27.0	59.5
25	48	26.7	58.8
26	42	26.6	58.6
27	36	26.3	57.9
28	29	26.8	59.0
29	27	27.8	61.2
30	22	29.5	65.0

Table 10. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant F

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	31	13.0	28.0
2	31	17.8	38.3
3	31	16.1	34.6
4	31	18.1	38.9
5	31	19.9	42.8
6	31	21.1	45.4
7	31	21.7	46.7
8	31	22.4	48.2
9	31	24.1	51.8
10	31	25.7	55.3
11	31	27.4	58.9
12	31	28.1	60.4
13	31	28.1	60.4
14	31	29.7	63.9
15	31	29.2	62.8
16	31	30.9	66.5
17	31	31.3	67.3
18	31	31.6	68.0
19	31	32.5	69.9
20	31	33.3	71.6
21	31	33.2	71.4
22	31	33.6	72.3
23	31	33.2	71.4
24	31	33.7	72.5
25	31	33.4	71.8
26	31	34.0	73.1
27	31	34.7	74.6
28	29	36.2	77.8
29	26	36.0	77.4
30	22	34.1	73.3
31	22	35.0	75.3
32	21	36.9	79.4
33	20	36.6	78.7
34	20	36.7	78.9
35	19	37.0	79.6
36	18	36.9	79.4
37	14	36.8	79.1
38	13	37.9	81.5

CHART 9 Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant F



earnings. The interquartile range of learners in the 18th, 24th and 30th weeks is notably smaller than that for experienced workers. This indicates that learners are more bunched about a central point than are the experienced workers.

In Plant G learners reach the first decile of experienced workers in the 13th week. In the 12th week the third quartile of learners considerably surpasses the first decile of experienced workers. In the 22nd week the average learner exceeds the first quartile of experienced workers. The learners progress quite steadily through the 15th week when their earnings are 82.7 percent of those of experienced workers. From that point on there is no marked and sustained progress. In the weeks beyond the 30th learners are earning very little more than in the 15th week. It is noticeable that in the 12th, 18th, 24th and 30th weeks, the interquartile range of learners is considerably smaller than that for experienced workers. In some weeks the quartile deviation for learners is less than half that for the experienced workers.

In Plant H the average learner does not reach the first decile of experienced workers within the period for which data were secured. In the 18th week the third quartile of learners greatly exceeds the first quartile and almost equals the average of experienced workers. The first plateau in the learning curve occurs between the 6th and 10th week; there is a considerable rise from the 10th to the 18th week, but the level of the 18th week is not attained again within the period for which data are available. However, relatively little weight can be given to this plant's experience because the sample is quite small. The smallness of the sample serves to explain the wide fluctuation in the third quartile from the 18th to the 24th week.

In Plant I the average learner does not reach the first decile of experienced workers within the 45 weeks for which the data were secured. In the 30th week the third quartile of learners exceeds the first decile of experienced workers. The learning curve rises very rapidly through the 8th week when the average earnings of learners are 51.2 percent those of experienced workers. Thereafter the learning curve rises less rapidly to the 22nd week when the average learner is earning 72.4 percent of the earnings of the average experienced worker. Thereafter progress is markedly slow and by the 45th week learners' earnings are 75.8 percent of experienced workers' earnings. It is particularly interesting to note that the interquartile range for experienced workers in this plant was greater than in any other plant surveyed, namely, 14.0 cents. The interquartile range for learners is quite steady in the weeks for which it was obtained and is considerably smaller than that of experienced workers.

SUMMARY

The week number in which the average learner reached any selected level of experienced worker earnings varied widely between plants. The week number in which learners reached the first decile of experienced workers, for instance, ranged from the 13th to the 30th; at three plants the first decile was not reached within the weeks for which there were data. There appears to be no consistent explanation for the wide variance among plants in the relationship of learners to experienced workers.

Table 11. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant G

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers
1	16	10.8	29.7
2	16	16.2	44.5
3	16	18.2	50.0
4	16	20.0	54.9
5	16	21.3	58.5
6	16	22.1	60.7
7	16	23.9	65.7
8	16	24.8	68.1
9	16	25.8	70.9
10	16	26.0	71.4
11	16	26.7	73.4
12	16	27.9	76.6
13	16	28.2	77.5
14	16	28.8	79.1
15	16	30.1	82.7
16	16	29.9	82.1
17	16	29.6	81.3
18	16	30.2	83.0
19	16	30.3	83.2
20	16	31.0	85.2
21	16	30.7	84.3
22	16	31.5	86.5
23	16	32.0	87.9
24	16	31.7	87.1
25	16	32.0	87.9
26	16	31.1	85.4
27	15	31.3	86.0
28	14	31.4	86.3
29	14	32.1	88.2
30	13	30.9	84.9
31	13	30.2	83.0
32	12	29.7	81.6
33	10	30.7	84.3
34	9	29.2	80.2

CHART 10. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant G

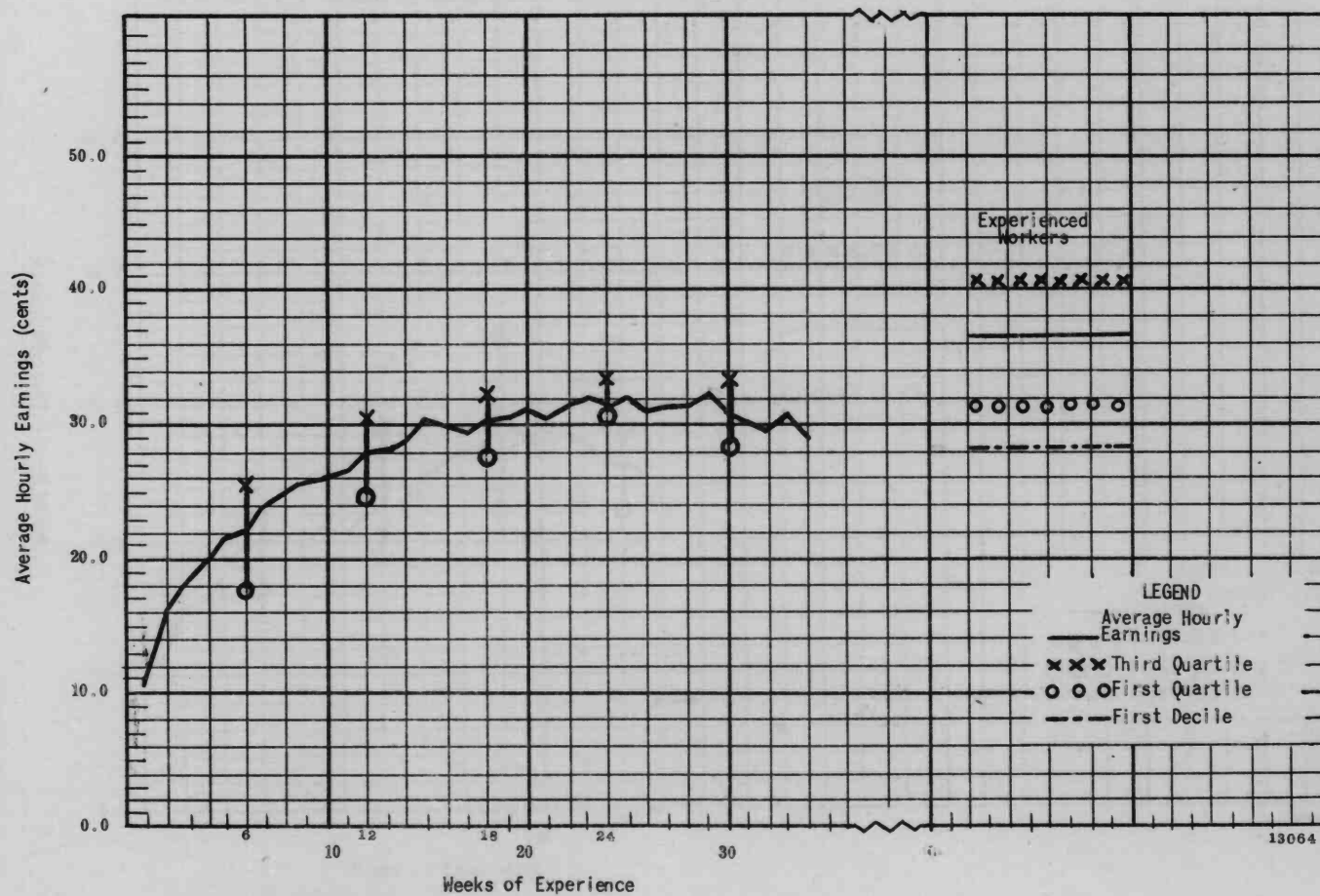
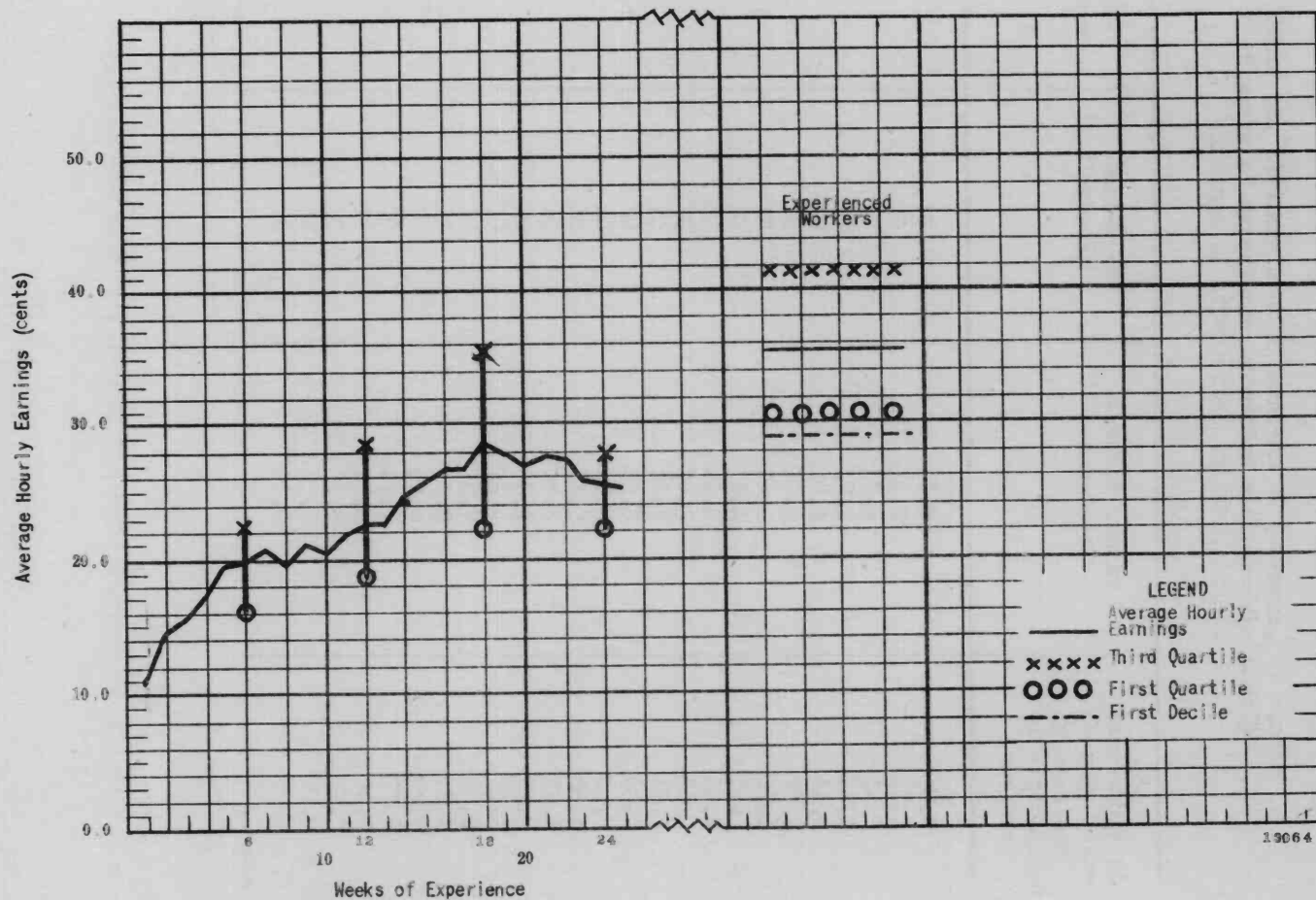


CHART 11. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers

Plant H



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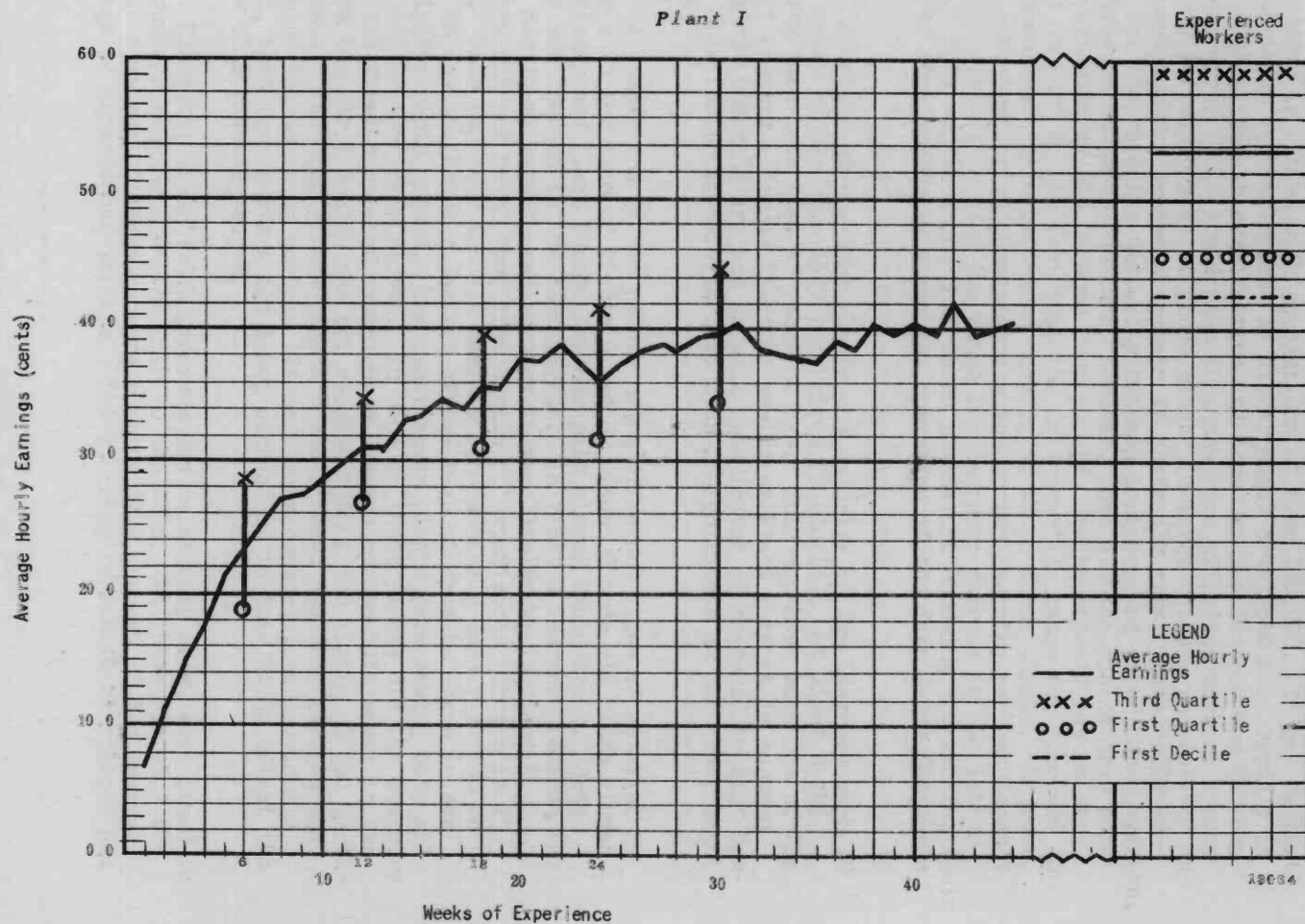
Table 12. Average hourly earnings of learners, by number of weeks of experience, compared with average hourly earnings of experienced workers. Plant H

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of average hourly earnings of experienced workers
1	10	10.7	30.0
2	10	14.3	40.1
3	10	15.3	42.9
4	10	17.2	48.2
5	10	19.5	54.6
6	10	19.9	55.7
7	10	20.5	57.4
8	10	19.4	54.3
9	10	21.0	58.8
10	10	20.3	56.9
11	10	21.3	59.7
12	10	22.8	63.9
13	10	22.8	63.9
14	10	24.3	68.1
15	10	25.5	71.4
16	10	26.4	73.9
17	10	26.5	74.2
18	10	28.7	80.4
19	10	27.9	78.2
20	10	27.0	75.6
21	10	27.7	77.6
22	10	27.4	76.8
23	10	25.8	72.3
24	10	25.3	70.9
25	8	25.0	70.0

Table 13. Average Hourly earnings of learners,
by number of weeks of experience, compared
with average hourly earnings of
experienced workers. Plant I.

Weeks of Experience	Number of Learners	Average hourly earnings	Percentage of the average hourly earnings of experienced workers.
1	37	7.0	13.1
2	37	11.1	20.8
3	37	14.6	27.4
4	37	17.7	33.2
5	37	20.9	39.2
6	37	23.2	43.5
7	37	24.9	46.7
8	37	27.3	51.2
9	37	27.7	52.0
10	37	28.4	53.3
11	37	29.9	56.1
12	37	31.1	58.3
13	37	31.1	58.3
14	37	33.1	62.1
15	37	33.7	63.2
16	37	34.2	64.2
17	37	34.0	63.8
18	37	35.4	66.4
19	37	35.7	67.0
20	37	37.4	70.2
21	37	37.5	70.4
22	37	38.6	72.4
23	37	37.6	70.5
24	37	36.1	67.7
25	37	37.4	70.2
26	37	38.1	71.5
27	37	38.8	72.8
28	37	38.6	72.4
29	37	39.2	73.5
30	37	39.7	74.5
31	37	40.2	75.4
32	37	38.6	72.4
33	37	38.2	71.7
34	37	37.9	71.1
35	36	37.8	70.9
36	36	39.1	73.4
37	36	38.5	72.2
38	35	40.3	75.6
39	35	39.9	74.9
40	35	40.1	75.2
41	34	39.9	74.9
42	31	42.0	78.8
43	32	39.8	74.7
44	31	40.0	75.0
45	30	40.4	75.8

CHART 12. Average hourly piece rate earnings of learners, by number of weeks of experience, compared with the average hourly earnings of experienced workers



The three plants with the highest wage levels were owned by the one company which had union contracts. The progress of this company's learners was noticeably slower in terms of experienced workers than that of the learners of the other two companies. This company's three plants were all located in cities with populations of over 100,000. It may be that opportunities for employment at higher wages developed more rapidly in large cities than in small cities and towns as the Defense and Victory Programs grew. This would mean that the more efficient workers ceased to apply for employment at glove plants in large cities, whereas the experienced workers tended to remain in their old jobs. This would account for the relative disparity between learners and experienced workers. The evidence seems to indicate, however, that all the plants were seriously affected by the Defense Program. ^{1/} The hypothesis may be supported in part by the fact that the interquartile range for learners is less than that for experienced workers at these three plants. However, it is also smaller in some plants with shorter learning periods located in small cities; in some the range for learners narrows in the latter weeks. This may indicate that these plants are choosing and culling their learners more carefully since the operation of the Fair Labor Standards Act.

At eight of the nine plants the majority of the learners were 18 to 25 years of age when they were hired (Table 14). At Plant H the majority were less than 18 years of age. This may have been one of the factors causing a longer learning period at Plant H if it is assumed that girls under 18 are not as well coordinated as those 18 to 25. However, this factor appears to have been insignificant at the other eight plants.

A comparison of two plants using different types of material is possible in the case of Plants G and H. Plant G made all cloth gloves exclusively and Plant H made leather palm gloves exclusively. Both plants are located in the same region. In Plant G learners reached the first decile of experienced workers in the 13th week; in Plant H learners did not reach the first decile of experienced workers in 25 weeks. This suggests that it takes a substantially longer period to learn to sew the heavier leather gloves than it does to learn to sew the lighter cloth gloves. The other seven plants were sewing both all cloth and leather palm gloves. In none of these plants did the learners reach the first decile of experienced workers by the 13th week; in two of them the first decile was not reached within the limits of the available data. The size of the plants seems to have had no effect on the length of the learning period. It must be remembered, as previously stated, that many factors not taken account of in this study affect the course of a learning curve.

Plateaus, after which progress was relatively slow, were found in week numbers ranging from the 11th to the 22nd. At these plateaus the average earnings of learners were 69.2 to 82.7 percent of the average earnings of experienced workers. The learning curves in six plants had

^{1/} See transcript of testimony, pp. 24-25, 33.

Table 14. Age of learners at the time they were hired, by plant

Plant	Age in years				
	Not given	Under 18	18-25	26-45	46 and over
A	16	--	--	--	--
B	--	3	7	2	--
C	1	--	12	2	--
D	--	1	15	5	--
E	1	13	32	2	--
F	3	10	15	3	--
G	--	--	10	5	1
H	--	2	5	3	--
I	1	21	13	1	1
Total	22	50	109	23	2

reached definitive plateaus by the 18th week. This type of measurement is not subject to as many dispersive factors as are others such as, for example, the week number in which learners achieve the minimum wage or the week number in which learners reach a specified level of experienced workers' earnings. For the purposes of the Fair Labor Standards Act it is perhaps the most significant single measurement in determining the length of the physical learning period. As previously stated, however, other factors must be considered by the Administrator in determining the length of time during which a learner may be employed at sub-minimum rates in a particular industry.

Appendix Table 1. Average hourly earnings of three learners
selected at random, by weeks of experience. Plant B.

Weeks of experience	Learner A	Learner B	Learner C
1	10.5	9.8	12.1
2	16.1	16.2	19.7
3	7.4	10.6	24.0
4	9.2	17.1	26.2
5	23.7	21.1	29.4
6	34.4	15.9	30.6
7	34.4	21.3	32.0
8	35.1	24.1	35.1
9	33.1	25.2	33.8
10	34.9	25.4	35.2
11	36.4	30.0	35.6
12	33.1	23.5	36.3
13	33.0	26.0	33.5
14	32.1	28.0	37.2
15	28.9	31.9	35.0
16	37.6	31.4	36.3
17	36.3	28.9	35.6
18	36.1	25.9	36.8
19	39.4	29.2	36.5
20	41.4	32.2	37.2
21	41.5	29.6	36.3
22	30.5	31.0	35.3
23	36.0	30.5	39.6
24	31.9	30.4	37.5
25	32.9	33.9	36.9
26	36.5	34.8	34.7
27	34.1	31.0	34.1
28	24.2	30.7	34.4
29	38.2	30.9	35.3
30	35.5	26.5	35.1
31	30.1	28.8	38.4
32	42.5	29.2	26.8
33	39.9	26.8	40.5
34			40.6
35			41.2
36			41.5
37			40.7
38			37.6
39			40.4
40			40.2
41			40.3
42			42.7
43			37.4
44			40.2
45			39.5
46			37.7
47			39.1
48			37.8
49			36.5
50			36.8
51			36.5
52			26.0

Appendix Table 2. Average hourly earnings of three learners selected at random, by weeks of experience. Plant F.

Weeks of experience	Learner A	Learner B	Learner C
1	16.6	12.1	9.0
2	20.5	25.1	12.4
3	18.5	28.5	19.4
4	29.8	30.4	12.6
5	25.6	29.0	17.7
6	20.0	26.7	22.7
7	10.8	30.1	17.1
8	15.3	30.9	19.0
9	15.4	35.2	25.4
10	17.4	35.9	30.4
11	20.4	37.6	35.5
12	24.0	31.5	34.2
13	21.0	29.8	31.4
14	26.1	33.0	33.3
15	19.0	30.5	34.6
16	24.4	33.7	41.1
17	18.7	37.9	43.3
18	27.1	31.2	40.6
19	30.8	31.3	41.5
20	25.1	35.7	44.1
21	28.0	35.6	41.7
22	24.1	38.2	37.1
23	28.9	36.5	33.8
24	28.5	36.7	34.5
25	28.8	37.6	41.6
26	33.5	35.8	44.9
27	39.1	36.8	33.9
28	39.0	43.1	34.7
29		45.9	42.5
30			26.1
31			28.2
32			34.3
33			39.5
34			42.6
35			38.7
36			38.0
37			33.7
38			38.8
39			34.5
40			31.1
41			34.5
42			38.0
43			50.8
44			46.0

Appendix Table 3. Average hourly earnings of three learners selected at random, by weeks of experience. Plant H

Weeks of experience	Learner A	Learner B	Learner C
1	7.7	13.8	8.1
2	11.1	16.8	13.3
3	19.4	20.1	15.9
4	22.1	15.7	17.2
5	23.9	19.2	20.7
6	25.2	21.5	21.0
7	29.5	20.6	18.2
8	21.2	20.6	9.5
9	35.9	16.7	10.0
10	29.7	17.4	10.2
11	27.9	23.2	10.6
12	28.5	19.8	14.9
13	29.4	20.0	12.9
14	37.1	21.6	15.1
15	35.4	20.0	20.1
16	34.5	20.6	27.3
17	30.0	26.0	25.6
18	37.0	21.7	28.4
19	39.6	22.7	15.4
20	40.6	21.7	14.0
21	37.6	23.7	25.1
22	35.7	27.3	23.6
23	27.9	29.1	20.6
24	27.2	26.7	19.5
25		20.6	17.8
26		24.4	21.0

Appendix table 4. Average hourly earnings of experienced workers at the first decile, first quartile, and third quartile, by plant.

Plant	First decile	First quartile	Third quartile
A	35.8	38.5	48.0
B	33.1	36.5	46.7
C	35.1	37.9	48.9
D	28.1	33.8	45.1
E	38.4	41.1	48.7
F	37.4	41.7	50.9
G	28.3	31.3	40.8
H	29.2	30.2	41.2
I	42.4	45.6	59.6

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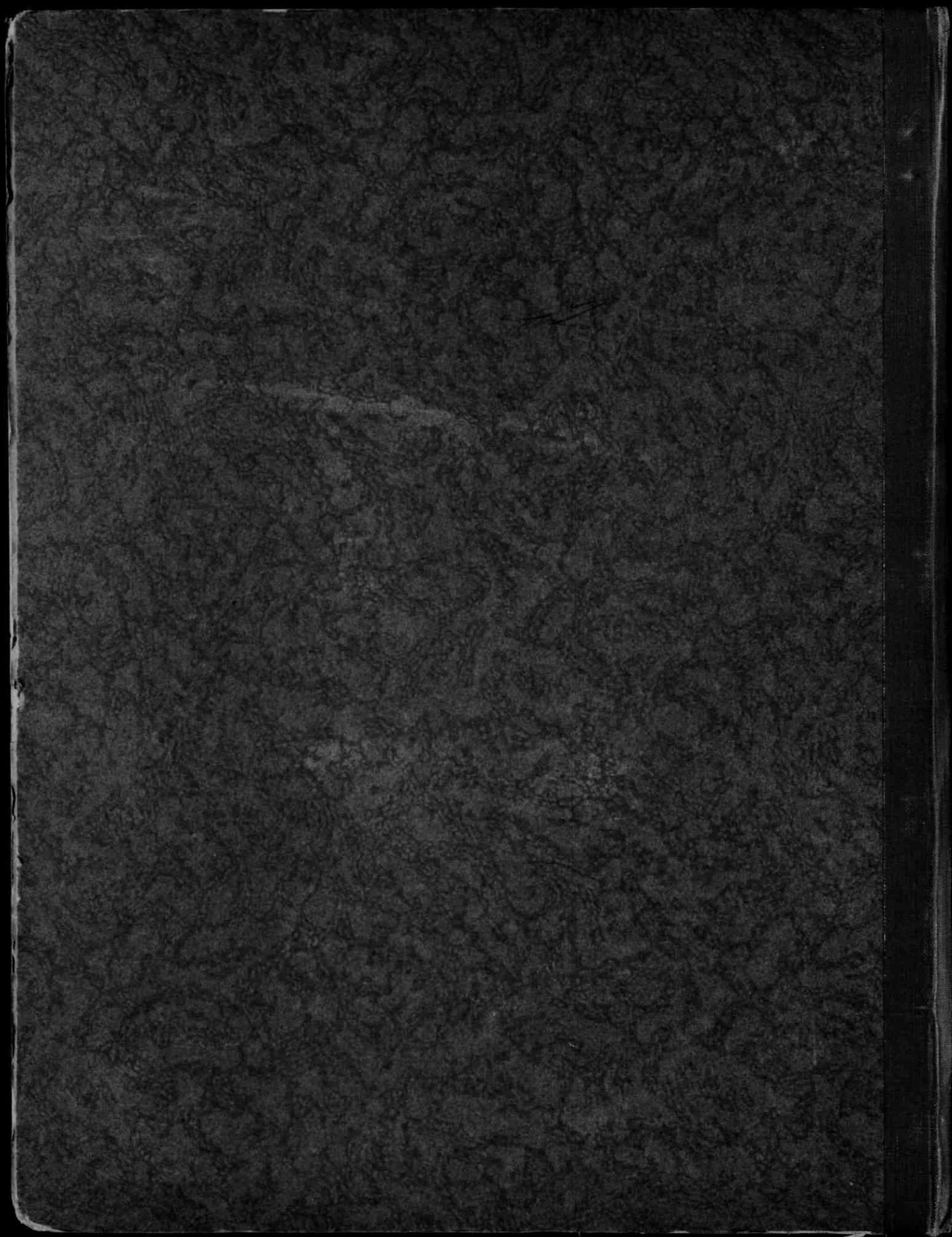
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